L1: Entry 1 of 39 File: USPT Jun 6, 2006

US-PAT-NO: 7056901
DOCUMENT-IDENTIFIER: US 7056901 B2

TITLE: Microgel particles for the delivery of bioactive materials

DATE-ISSUED: June 6, 2006

PRIOR-PUBLICATION:

DOC-ID	DATE
US 20030211158 A1	November 13, 2003

INVENTOR-INFORMATION:

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US-CL-CURRENT: 514/54; 424/184.1, 424/486, 424/488, 435/6, 435/69.1, 514/44, 514/58, 514/59, 530/350, 536/23.1, 536/23.4

CLAIMS:

What is claimed is:

1. An acid hydrolyzable microgel composition, comprising: (a) a polymer backbone crosslinked by an acid hydrolyzable crosslinker, wherein said crosslinker hydrolyzes at pH 4.5 to pH 7.4; (b) the crosslinker having the formula R.sup.2CH(OR.sup.1).sub.2, wherein R.sup.1 is an acryloyl group; and R.sup.2 is Ar--X where X is a water solubilizing group selected from hydrogen, methoxy, --O--(CH.sub.2--CH.sub.2--O).sub.n--CH.sub.3 wherein n is from 1 to 10, --O--CH.sub.2--CH.sub.2--O--C(O)--O--Ph--NO.sub.2 and --O--CH.sub.2--CH.sub.2--CH.sub.2 --NH--CO-(dextran polysaccharide), said dextran polysaccharide having a molecular weight from 300 to 100,000 daltons; and Ar is an aryl group; (c) a particle size of the microgel composition between 0.1 10 microns; and (d) cross linkages between 1 and 20 mole percent.

2. The composition of claim 1 wherein R.sup.1 is ethylacrylamide and R.sup.2 is such that Ar is phenyl and X is methoxy.

3. The composition of claim 1 wherein R.sup.1 is an acrylate, whereby crosslinker hydrolysis causes generation of further acidic species in an autocatalytic manner.

4. The composition of claim 1 wherein the particle size is between 200 nm and 500 nm.

5. The composition of claim 1 wherein said polymer backbone is comprised of a dextran polysaccharide, said dextran polysaccharide having a molecular weight from 300 to 100,000 daltons.

6. The composition of claim 1 further comprising a bioactive material, wherein the bioactive material is selected from the group consisting of palysaccharides, DNA, RNA, amino acids, and proteins.

7. The composition of claim 6 whereby the bioactive material is physically entrapped within the microgel composition.

8. The composition of claim 6 whereby the bioacdve material is adsorbed onto the microgel composition.

9. The composition of claim 6 wherein said bioactive material is an antigen.

10. The composition of claim 6 wherein the bioactive material is unmethylated DNA.

11. An acid hydrolyzable polydextran microgel composition for delivering a bioactive material, comprising: (a) a polymerized and crosslinked acid hydrolyzable crosslinker of the formula R.sup.2CH(OR.sup.1).sub.2, wherein said crosslinker hydrolyzes pH 5.0 to pH 7.4, wherein R.sup.1 is an acryloyl group, and R.sup.2 is Ar--X where X is an alkyl dextran, wherein said dextran has a molecular weight from 300 to 100,000 daltons; and Ar is an aryl group; (b) a particle size of the polydextran microgel composition between 0.1 10 microns; and (c) cross linkages between 1 and 20 mole percent.

12. The composition of claim 11 wherein said alkyl-dextran linker has the formula --O--CH.sub.2--CH.sub.2--O--C(O)--NH--[CH.sub.2--CH.sub.2--O].sub- .2--CH.sub.2--CH.sub.2--NH --C(O)-dextran, wherein said dextran has a molecular weight from 300 to 100,000 daltons.

13. The composition of claim 11 further comprising a bioactive material, wherein the bioactive material is selected from the group consisting of polysaccharides, DNA, RNA, amino acids, and proteins.

14. The composition of claim 13 whereby the bioactive material is physically entrapped within the microgel composition.

15. The composition of claim 13 whereby the bioactive material is adsorbed onto the microgel composition.

16. The composition of claim 13 wherein said bioactive material is an antigen.

17. The composition of claim 13 wherein the bioactive material is unmethylated DNA.

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L1: Entry 3 of 39 File: USPT Apr 18, 2006

US-PAT-NO: 7030097
DOCUMENT-IDENTIFIER: US 7030097 B1

TITLE: Controlled nucleic acid delivery systems

DATE-ISSUED: April 18, 2006

INVENTOR-INFORMATION:

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US-CL-CURRENT: 514/44; 424/450, 435/320.1, 435/455, 435/825

CLAIMS:

The invention claimed is:

1. A nucleic acid delivery system comprising: a polymeric structure formed of a biocompatible polymer and a mixture comprising one or more nucleic acid molecules and a first co-dispersant, which is an inert polymer that is different from the biocompatible polymer and does not interact with the one or more nucleic acid molecules, the mixture being contained within the polymeric structure, wherein the first co-dispersant is present in an amount effective to reduce the rate of diffusion of the one or more nucleic acid molecules from the polymeric structure for sustained release of the one or more nucleic acid molecules as compared to a polymeric structure comprising the one or more nucleic acid molecules absent an effective amount of the first co-dispersant.

2. The nucleic acid delivery system according to claim 1, wherein the polymeric structure is a matrix or a microsphere.

3. The nucleic acid delivery system according to claim 2, wherein the polymeric structure is a matrix which is less than about 10 cm in length.

4. The nucleic acid delivery system according to claim 2, wherein the polymeric structure is a microsphere which is less than about 10 .mu.m in length.

5. The nucleic acid delivery system according to claim 1, wherein the biocompatible polymer is poly(ethylene-co-vinyl acetate), poly(lactide-co-glycolide), poly (caprolactone), poly(lactide), polyglycolide, polyanhydride, polyorthoester, polyphosphazene, proteinaceous polymer, polyester, silicone, or combinations thereof.

6. The nucleic acid delivery system according to claim 1, wherein the one or more nucleic acid molecules are the same or different with each being inserted in a heterologous expression vector.

7. The nucleic acid delivery system according to claim 6, wherein the nucleic acid

molecule is inserted in the expression vector in sense orientation.

8. The nucleic acid delivery system according to claim 7, wherein the nucleic acid molecule is a DNA molecule which encodes a translatable RNA transcript encoding a protein or polypeptide.

9. The nucleic acid delivery system according to claim 7, wherein the nucleic acid molecule is a DNA molecule which encodes an untranslatable RNA transcript.

10. The nucleic acid delivery system according to claim 7, wherein the nucleic acid molecule is an RNA molecule.

11. The nucleic acid delivery system according to claim 6, wherein the nucleic acid molecule is inserted in the expression vector in antisense orientation.

12. The nucleic acid delivery system according to claim 11, wherein the nucleic acid molecule is a DNA molecule.

13. The nucleic acid delivery system according to claim 11, wherein the nucleic acid molecule is an RNA molecule.

14. The nucleic acid delivery system according to claim 1, wherein the inert polymer is selected from the group consisting of herring sperm DNA, a random or non-coding DNA having a molecular weight of about 100 kDa to about 2000 kDa, a DNase-free filler, a DNase-free bulk protein, DNase free peptide, glycoproteins, peptide-nucleic acids, and combinations thereof.

15. The nucleic acid delivery system according to claim 1, wherein each of the one or more nucleic acid molecules is a DNA molecule, the nucleic acid delivery system further comprising: a nucleus translocation polypeptide coupled individually to each DNA molecule.

16. The nucleic acid delivery system according to claim 1, wherein the mixture further comprises a cellular uptake agent.

17. The nucleic acid delivery system according to claim 16, wherein the cellular uptake agent is a target cell receptor binding ligand.

18. The nucleic acid delivery system according to claim 16, wherein the cellular uptake agent is coupled individually to each of the one or more nucleic acid molecules.

19. The nucleic acid delivery system according to claim 1, wherein the mixture further comprises a second co-dispersant which stabilizes the one or more nucleic acid molecules.

20. The nucleic acid delivery system according to claim 19, wherein the second co-dispersant is selected from the group consisting of a cationic polymer, a DNA binding protein, and a DNase inhibitor.

21. The nucleic acid delivery system according to claim 20, wherein the second co-dispersant is a cationic polymer selected from the group consisting of poly-L-lysine, poly-L-lysine conjugates and copolymers, polyethyleneimine, diethylaminoethyl-dextran, cationic dendritic polymers, and combinations thereof.

22. The nucleic acid delivery system according to claim 20, wherein the second co-dispersant is a DNA binding protein selected from the group consisting of histones, histone-1 derived peptide, cationic polypeptides, protamines, spermine, spermidines, and combinations thereof.

23. The nucleic acid delivery system according to claim 20, wherein the second co-dispersant is a DNase inhibitor is DMI-2.

24. A composition comprising: a nucleic acid delivery system according to claim 1 and a pharmaceutically-acceptable carrier.

25. A method of delivering a nucleic acid molecule into a cell in a patient comprising: providing a nucleic acid delivery system according to claim 1 and administering the nucleic acid delivery system to the patient under conditions effective to contact a cell in the patient with the one or more nucleic acid molecules following release from the nucleic acid delivery system, wherein the one or more nucleic acid molecules are taken up by the cell.

26. The method according to claim 25, wherein the structure of the nucleic acid delivery system is a matrix or a microsphere.

27. The method according to claim 25, wherein the biocompatible polymer is poly(ethylene-co-vinyl acetate), poly(lactide-co-glycolide), poly(caprolactone), poly(lactide), polyglycolide, polyanhydride, polyorthoester, polyphosphazene, proteinaceous polymer, polyester, silicone, or combinations thereof.

28. The method according to claim 25, wherein the one or more nucleic acid molecules are the same or different with each being inserted in a heterologous expression vector.

29. The method according to claim 25, wherein each of the one or more nucleic acid molecules is a DNA molecule, the nucleic acid delivery system further comprising: a nucleus translocation polypeptide coupled individually to each DNA molecule.

30. The method according to claim 25, wherein the mixture further comprises a cellular uptake agent.

31. The method according to claim 30, wherein the cellular uptake agent is coupled individually to each of the one or more nucleic acid molecules.

32. The method according to claim 25, wherein the mixture further comprises: a second co-dispersant selected from the group consisting of a cationic polymer, a DNA binding protein, and a DNase inhibitor.

33. The method according to claim 25, wherein said administering is carried out orally, parenterally, subcutaneously, intravenously, intramuscularly, intraperitoneally, by intranasal instillation, by implantation, by intracavitary or intravesical instillation, intraocularly, intraarterially, intralesionally, or by application to mucous membranes.

34. The method according to claim 33, wherein said administering is carried out by implanting the nucleic acid delivery system in the patient.

35. The method according to claim 34, wherein said implanting is carried out by implanting the nucleic acid delivery system in a tissue comprising the cell.

36. The method according to claim 33, wherein said administering is carried out by injecting the nucleic acid delivery system into the patient.

37. The method according to claim 25, wherein the nucleic acid delivery system is present in the form of a composition comprising the nucleic acid delivery system and a pharmaceutically-acceptable carrier and said administering is carried out by administering the composition into the patient.

38. The method according to claim 25, wherein the one or more nucleic acid molecules each encode a protein or polypeptide.

39. The nucleic acid delivery system according to claim 1, wherein the weight ratio of the one or more nucleic acid molecules to the first co-dispersant is about 0.0001 1:1.

40. A method of making a nucleic acid delivery system comprising: providing a mixture comprising one or more nucleic acid molecules and a first co-dispersant, which is an inert polymer that does not interact with the one or more nucleic acid molecules; providing a biocompatible polymer that is different from the inert polymer; and combining the mixture with the biocompatible polymer under conditions effective to form a polymeric structure in which the mixture is contained, wherein the first co-dispersant is present in an amount that is effective to reduce the rate of diffusion of the one or more nucleic acid molecules from the polymeric structure as compared to a polymeric structure comprising the one or more nucleic acid molecules absent an effective amount of the first co-dispersant.

41. The method according to claim 40, wherein said providing a biocompatible polymer comprises: providing the biocompatible polymer dissolved in a solvent to form a solution.

42. The method according to claim 41, wherein the biocompatible polymer is poly(ethylene-co-vinyl acetate), poly(lactide-co-glycolide) or poly(lactic acid) and the solvent is methylene chloride.

43. The method according to claim 41, wherein said combining is carried out by substantially mixing the mixture into the solution; introducing the solution into a mold; and treating the solution under conditions effective substantially to remove the solvent, thereby yielding the polymeric structure in which the mixture is contained.

44. The method according to claim 41, wherein said providing the mixture comprises: dissolving the mixture in a second solvent to produce a second solution.

45. The method according to claim 44, wherein said combining is carried out by blending the solution and the second solution under conditions effective to form a first emulsion; introducing polyvinyl alcohol to the first emulsion under conditions effective to form a second emulsion; and treating the second emulsion under conditions effective to form the polymeric structure in which the mixture is contained.

46. A nucleic acid delivery system comprising: a polymeric structure formed of a biocompatible polymer and a mixture comprising (i) one or more nucleic acid molecules that encode a protein or polypeptide or RNA product, and (ii) a first co-dispersant that is inert with respect to the one or more nucleic acid molecules and is selected from the group consisting of herring sperm DNA, a random or non-coding DNA having a molecular weight of about 100 kDa to about 2000 kDa, a DNase-free filler, a DNase-free bulk protein, Ficoll, dextran, diethylaminoethyl-dextran, dextran sulfate, ovalbumin, DNase free peptide, glycoproteins, peptide-nucleic acids, and combinations thereof, the mixture being contained within the polymeric structure, wherein the first co-dispersant is present in an amount effective to reduce the rate of diffusion of the one or more nucleic acid molecules from the polymeric structure.

47. A method of inducing an immune response in a patient comprising: providing a nucleic acid delivery system according to claim 46, wherein the one or more nucleic acid molecules encode an antigenic protein or polypeptide; and administering the nucleic acid delivery system to a patient under conditions effective to cause sustained release of the one or more nucleic acid molecules from the nucleic acid delivery system and uptake of the one or more nucleic acid molecules by cells of the patient, whereby upon expression of the one or more nucleic acid molecules the antigenic protein or polypeptide is expressed and an immune response is induced against the antigenic protein or polypeptide.

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L1: Entry 7 of 39 File: USPT Apr 26, 2005

US-PAT-NO: 6884435
DOCUMENT-IDENTIFIER: US 6884435 B1
**** See image for Certificate of Correction ****

TITLE: Microparticles with adsorbent surfaces, methods of making same, and uses thereof

DATE-ISSUED: April 26, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Singh; Manmohan	Hercules	CA		
Ott; Gary	Oakland	CA		

US-CL-CURRENT: 424/489; 424/455, 424/490, 435/320.1, 514/44, 536/23.1

CLAIMS:

We claim:

1. A microparticle comprising: a polymer selected from the group consisting of a poly (.alpha.-hydroxy acid), a polyhydroxy butyric acid, a polycaprolactone, a polyorthoester, a polyanhydride, and a polycyanoacrylate; a cationic detergent; and an antigen comprising a polynucleotide adsorbed on the surface of said microparticle, wherein said microparticle is formed by a process that comprises: forming a microparticle comprising said polymer and said detergent, said microparticle being formed in the presence of said detergent; and exposing said microparticle to said antigen.

2. The microparticle of claim 1, further comprising an additional biologically active macromolecule encapsulated within said microparticle, wherein the additional biologically active macromolecule is selected from a polypeptide, a polynucleotide, a polynucleoside, an antigen, a hormone, an enzyme, and an immunological adjuvant.

3. The microparticle of claim 2, wherein the additional biologically active macromolecule is an immunological adjuvant.

4. The microparticle of claim 3, wherein the immunological adjuvant is an aluminum salt.

5. The microparticle of claim 1, wherein the poly(.alpha.-hydroxy acid) is selected from poly(L-lactide), poly(D,L-lactide) and poly(D,L-lactide-co-glycolide).

6. The microparticle of claim 1, wherein the polymer is poly(D,L-lactide-co-glycolide).

7. The microparticle of claim 1, wherein said polynucleotide encodes a polypeptide selected from an HIV gp 160polypeptide, an HIV p24gag polypeptide, an HIV p55gag polypeptide, and an Influenza A hemagglutinin polypeptide.

8. The microparticle of claim 1, wherein said polynucleotide encodes an HIV gp 120 polypeptide.

9. The microparticle of claim 1 wherein the cationic detergent is hexadecyltrimethylammonium bromide.

10. A microparticle composition comprising a microparticle of any one of claims 1, 2-6 and 7-4 and a pharmaceutically acceptable excipient.

11. The microparticle composition of claim 10, wherein said microparticle composition is an injectable composition.

12. A microparticle composition comprising a microparticle according to any one of claims 1, 5, 6, 7 and 8, a pharmaceutically acceptable excipient, and an immunological adjuvant.

13. A microparticle composition of claim 12, wherein the immunological adjuvant is selected from CpG oligonucleotides, E. coli heat-labile toxin-K63 (LTK63), E. coli heat-labile toxin-R72 (LTR72) monophosphorylipid A (MPL), and an aluminum salt.

14. A microparticle composition of claim 13, wherein the aluminum salt is aluminum phosphate.

15. The microparticle composition of claim 12, wherein said microparticle composition is an injectable composition.

16. The microparticle of any one of claims 1, 2-6 and 7-4, wherein said polynucleotide is a plasmid DNA molecule.

17. A microparticle composition comprising a microparticle of claim 16 and a pharmaceutically acceptable excipient.

18. The microparticle composition of claim 17, wherein said microparticle composition is an injectable composition.

19. The microparticle of any of claims 1, 2-6, 3 and 4, wherein the polynucleotide encodes a polypeptide selected from HIV polypeptides, hepatitis B virus polypeptides, hepatitis C virus polypeptides, Haemophilus influenza type B polypeptides, pertussis polypeptides, diphtheria polypeptides, tetanus polypeptides, and influenza A virus polypeptides.

20. A microparticle composition comprising a microparticle of claim 19 and a pharmaceutically acceptable excipient.

21. The microparticle composition of claim 20, wherein said microparticle composition is an injectable composition.

22. The microparticle of any one of claims 1, 2-6, 7-4 and 9, wherein said microparticle does not comprise an entrapped antigen.

23. The microparticle of any one of claims 1, 2-6, 7-4 and 9, wherein said microparticle is formed in a double emulsion process.

24. The microparticle of any one of claims 1, 2-6, 3, 4 and 9, wherein the polynucleotide encodes a polypeptide derived from a pathogenic organism.

25. The microparticle of claim 24 wherein said pathogenic organism is a bacterium.

26. The microparticle of claim 24, wherein said pathogenic organism is a virus.

27. A microparticle composition comprising a microparticle of claim 24 and a pharmaceutically acceptable excipient.

28. The microparticle composition of claim 27, wherein said microparticle composition is an injectable composition.

29. The microparticle of any one of claims 1, 2-6, 7-4 and 9, wherein the microparticle has a diameter between 500 nanometers and 10 microns.

30. A microparticle composition comprising a microparticle of claim 29 and a pharmaceutically acceptable excipient.

31. The microparticle composition of claim 30, wherein said microparticle composition is an injectable composition.

32. The microparticle of any one of claims 1, 2, 5, 6, 3 and 4, wherein said polynucleotide encodes a polypeptide derived from a tumor antigen.

33. A microparticle composition comprising a microparticle of claim 32 and a pharmaceutically acceptable excipient.

34. The microparticle composition of claim 32 wherein said microparticle composition is an injectable composition.

35. The microparticle of any one of claims 2, 7-4 and 9, wherein the polymer is poly(D,L-lactide-co-glycolide).

36. A microparticle composition comprising a microparticle of claim 35 and a pharmaceutically acceptable excipient.

37. The microparticle composition of claim 36, wherein said microparticle composition is an injectable composition.

38. A method of raising an immune response, comprising: providing the microparticle composition of claim 10, and administering said microparticle composition to a vertebrate animal.

39. A method of raising an immune response, comprising: providing the microparticle composition of claim 12, and administering said microparticle composition to a vertebrate animal.

40. A method of raising an immune response, comprising: providing the microparticle composition of claim 17, and administering said microparticle composition to a vertebrate animal.

41. A method of raising an immune response, comprising: providing the microparticle composition of claim 30, and administering said microparticle composition to a vertebrate animal.

42. A method of raising an immune response, comprising: providing the microparticle composition of claim 36, and administering said microparticle composition to a vertebrate animal.

43. A method of raising an immune response, comprising: providing the microparticle composition of claim 20, and administering said microparticle composition to a vertebrate animal.

44. A method of raising an immune response, comprising: providing the microparticle composition of claim 27, and administering said microparticle composition to a vertebrate animal.

45. A method of raising an immune response, comprising: providing the microparticle composition of claim 33, and administering said microparticle composition to a vertebrate animal.

46. A microparticle comprising: a biodegradable polymer; a cationic detergent; and an antigen comprising a polynucleotide adsorbed on the surface of said microparticle, wherein said microparticle is formed by a process that comprises: forming a microparticle comprising said polymer and said detergent, said microparticle being formed in the presence of said detergent; and exposing said microparticle to said antigen.

47. The microparticle of claim 46, further comprising an additional biologically active macromolecule encapsulated within said microparticle, wherein the additional biologically active macromolecule is selected from a polypeptide, a polynucleotide, a polynucleoside, an antigen, a hormone, an enzyme, and an immunological adjuvant.

48. A microparticle composition comprising a microparticle of any one of claims 46 and 47 and a pharmaceutically acceptable excipient.

49. The microparticle composition of claim 48, wherein said microparticle composition is an injectable composition.

50. A microparticle composition comprising a microparticle according to any one of claims 46 and 47 a pharmaceutically acceptable excipient, and an immunological adjuvant.

51. The microparticle of composition of claim 50, wherein said microparticle composition is an injectable composition.

52. A method of raising an immune response, comprising: providing the microparticle composition of claim 48, and administering said microparticle composition to a vertebrate animal.

53. A method of raising an immune response, comprising: providing the microparticle composition of claim 50, and administering said microparticle composition to a vertebrate animal.

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L1: Entry 8 of 39 File: USPT Feb 15, 2005

US-PAT-NO: 6855492
DOCUMENT-IDENTIFIER: US 6855492 B2

TITLE: Use of microparticles combined with submicron oil-in-water emulsions

DATE-ISSUED: February 15, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 435/4; 424/204.1, 424/278.1, 424/70.11, 424/70.19, 435/5, 435/6

CLAIMS:

We claim:

1. A method of inducing an immune response which comprises administering to a vertebrate subject (a) a submicron oil-in-water emulsion immunological adjuvant, and (b) a therapeutically effective amount of a selected antigen entrapped in, or adsorbed to, a biodegradable microparticle, wherein the submicron oil-in-water emulsion comprises 1% to 12% by volume of a non-toxic metabolizable oil and 0.02% to 2.5% (w/v) of emulsifying agent.

2. The method of claim 1, wherein the microparticle is formed from a poly(.alpha.-hydroxy acid) selected from the group consisting of poly(L-lactide), poly(D,L-Iactide) and poly (D,L-lactide-co-glycolide).

3. The method of claim 2, wherein the microparticle is formed from poly(D,L-lactide-co-glycolide.

4. The method of claim 1, wherein the submicron oil-in-water emulsion comprises 4-5% w/v squalene, 0.25-0.5% w/v polyoxyethylene sorbitan monooleate, and 0.5% w/v sorbitan trioleate, and optionally, N-acetylmuramyl-L-alanyl-D-isogluatminyl-L-alanine-2-(1'-2'-dipalmitoyl-sn -glycero-3-hydroxyphosphoryloxy)-ethylamine.

5. The method of claim 1, wherein the selected antigen is a viral antigen.

6. The method of claim 5, wherein the selected antigen is gp 120.

7. The method of claim 5, wherein the selected antigen is p24gag.

8. The method of claim 5, wherein the selected antigen is hepatitis C virus E2.

9. The method of claim 1, wherein the selected antigen is entrapped in the microp article.

10. The method of claim 1, wherein the selected antigen is adsorbed to the microparticle.

11. The method of claim 1, wherein the submicron oil-in-water emulsion is administered prior to the microparticle.

12. The method of claim 1, wherein the submicron oil-in-water emulsion is administered subsequent to the microparticle.

13. The method of claim 1, wherein the submicron oil-in-water emulsion is administered substantially concurrently with the microparticle.

14. The method of claim 1, wherein the submicron oil-in-water emulsion further comprises N-acetylmuramyl-L-alanyl-D-isogluatminyl-L-alanine-2-(1'-2'-dipalmitoyl-sn -glycero-3-hydroxyphosphoryloxy)-ethylamine.

15. the method of claim 4, wherein the submicron oil-in-water emulsion further comprises N-acetylmuramyl-L-alanyl-D-isogluatminyl-L-alanine-2-(1'-2'-dipalmitoyl-sn -glycero-3-hydroxyphosphoryloxy)-ethylamine.

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☐ 1. Document ID: US 7056901 B2

L1: Entry 1 of 39 File: USPT Jun 6, 2006

US-PAT-NO: 7056901
DOCUMENT-IDENTIFIER: US 7056901 B2

TITLE: Microgel particles for the delivery of bioactive materials

DATE-ISSUED: June 6, 2006

PRIOR-PUBLICATION:

DOC-ID	DATE
US 20030211158 A1	November 13, 2003

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US-CL-CURRENT: 514/54; 424/184.1, 424/486, 424/488, 435/6, 435/69.1, 514/44, 514/58, 514/59, 530/350, 536/23.1, 536/23.4

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

☐ 2. Document ID: US 7037499 B1

L1: Entry 2 of 39 File: USPT May 2, 2006

US-PAT-NO: 7037499
DOCUMENT-IDENTIFIER: US 7037499 B1

TITLE: Adjuvant for transcutaneous immunization

DATE-ISSUED: May 2, 2006

INVENTOR-INFORMATION:

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US-CL-CURRENT: 424/184.1; 424/234.1, 424/236.1, 424/240.1, 424/241.1, 424/261.1, 424/447, 424/449, 424/450

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

☐ 3. Document ID: US 7030097 B1

L1: Entry 3 of 39 File: USPT Apr 18, 2006

US-PAT-NO: 7030097
DOCUMENT-IDENTIFIER: US 7030097 B1

TITLE: Controlled nucleic acid delivery systems

DATE-ISSUED: April 18, 2006

INVENTOR-INFORMATION:

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US-CL-CURRENT: 514/44; 424/450, 435/320.1, 435/455, 435/825

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

☐ 4. Document ID: US 6933132 B1

L1: Entry 4 of 39 File: USPT Aug 23, 2005

US-PAT-NO: 6933132
DOCUMENT-IDENTIFIER: US 6933132 B1

TITLE: Regulation of immune responses by attractin

DATE-ISSUED: August 23, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 435/69.1; 435/252.3, 435/320.1, 435/325, 435/455, 536/23.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

☐ 5. Document ID: US 6916490 B1

L1: Entry 5 of 39 File: USPT Jul 12, 2005

US-PAT-NO: 6916490
DOCUMENT-IDENTIFIER: US 6916490 B1

TITLE: Controlled release of bioactive substances

DATE-ISSUED: July 12, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Kalyanasundaram; Subramanian	Gaithersburg	MD		
Leong; Kam W.	Ellicott City	MD		

US-CL-CURRENT: 424/489; 424/93.1, 424/93.2, 435/320.1, 435/455

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 6899898 B2

L1: Entry 6 of 39 File: USPT May 31, 2005

US-PAT-NO: 6899898
DOCUMENT-IDENTIFIER: US 6899898 B2

TITLE: Induced phase transition method for the production of microparticles containing hydrophobic active agents

DATE-ISSUED: May 31, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Albayrak; Celal	Munich			DE

US-CL-CURRENT: 424/489; 424/451, 424/490, 424/497

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 7. Document ID: US 6884435 B1

L1: Entry 7 of 39 File: USPT Apr 26, 2005

US-PAT-NO: 6884435
DOCUMENT-IDENTIFIER: US 6884435 B1
**** See image for Certificate of Correction ****

TITLE: Microparticles with adsorbent surfaces, methods of making same, and uses thereof

DATE-ISSUED: April 26, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
O'Hagan; Derek	Berkeley	CA		
Singh; Manmohan	Hercules	CA		
Ott; Gary	Oakland	CA		

US-CL-CURRENT: 424/489; 424/455, 424/490, 435/320.1, 514/44, 536/23.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 8. Document ID: US 6855492 B2

L1: Entry 8 of 39 File: USPT Feb 15, 2005

US-PAT-NO: 6855492
DOCUMENT-IDENTIFIER: US 6855492 B2

TITLE: Use of microparticles combined with submicron oil-in-water emulsions

DATE-ISSUED: February 15, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
O'Hagan; Derek	Berkeley	CA		
Van Nest; Gary	El Sobrante	CA		
Ott; Gary S.	Oakland	CA		
Singh; Manmohan	Hercules	CA		

US-CL-CURRENT: 435/4; 424/204.1, 424/278.1, 424/70.11, 424/70.19, 435/5, 435/6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 9. Document ID: US 6797276 B1

L1: Entry 9 of 39 File: USPT Sep 28, 2004

US-PAT-NO: 6797276
DOCUMENT-IDENTIFIER: US 6797276 B1
** See image for Certificate of Correction **

TITLE: Use of penetration enhancers and barrier disruption agents to enhance the transcutaneous immune response

DATE-ISSUED: September 28, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Glenn; Gregory M.	Cabin John	MD		
Alving; Carl R.	Bethesda	MD		

US-CL-CURRENT: 424/278.1; 424/184.1, 424/204.1, 424/206.1, 424/234.1, 424/241.1, 424/265.1, 424/274.1, 424/283.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 10. Document ID: US 6759385 B1

L1: Entry 10 of 39 File: USPT Jul 6, 2004

US-PAT-NO: 6759385
DOCUMENT-IDENTIFIER: US 6759385 B1
** See image for Certificate of Correction **

TITLE: Methods to treat undesirable immune responses

DATE-ISSUED: July 6, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Conti-Fine; Bianca M.	Minneapolis	MN		

US-CL-CURRENT: 514/2; 424/184.1, 424/185.1, 530/300

Terms	Documents
5783567	39

L1: Entry 11 of 39 File: USPT Jun 22, 2004

US-PAT-NO: 6753015
DOCUMENT-IDENTIFIER: US 6753015 B2

TITLE: Microparticle compositions and methods for the manufacture thereof

DATE-ISSUED: June 22, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fang; Jia-Hwa	Oakland	CA		
Singh; Mammohan	Hercules	CA		
O'Hagan; Derek	Berkeley	CA		
Hora; Maninder	Danville	CA		

US-CL-CURRENT: 424/489; 424/484, 424/486

ABSTRACT:

Microparticles with adsorbed complexes of macromolecule and detergent, methods of making such microparticles, and uses thereof, are disclosed. The microparticles comprise a polymer, such as a poly(.alpha.-hydroxy acid), a polyhydroxy butyric acid, a polycaprolactone, a polyorthoester, a polyanhydride, and the like, and are formed using cationic, anionic, or nonionic detergents. The surfaces of the microparticles have adsorbed thereon a complex of biologically active macromolecules, such as nucleic acids, polypeptides, antigens, and adjuvants, and a detergent. Preferred polymers are poly(D,L-lactide-co-glycolides), more preferably those having a lactide/glycolide molar ratio ranging from 40:60 to 60:40 and having a molecular weight ranging from 30,000 Daltons to 70,000 Daltons. Preferred macromolecules are bacterial and viral antigens (such as HIV antigens, meningitis B antigens, streptococcus B antigens, and Influenza A hemagglutinin antigens) as well as polynucleotides that encode for such antigens.

51 Claims, 1 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 1

L1: Entry 12 of 39 File: USPT Jun 1, 2004

US-PAT-NO: 6743444
DOCUMENT-IDENTIFIER: US 6743444 B2

TITLE: Method of making microencapsulated DNA for vaccination and gene therapy

DATE-ISSUED: June 1, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jones; David Hugh	Salisbury			GB
Farrar; Graham Henry	Salisbury			GB
Clegg; James Christopher Stephen	Salisbury			GB

US-CL-CURRENT: 424/468; 424/489, 424/490, 424/497, 435/320.1, 514/44

ABSTRACT:

A method of making a microparticle that contains DNA coding for a polypeptide is described in which a solvent extraction method is used and solvent extraction takes place at elevated temperature. Oral administration of the microparticle leads to its expression. DNA coding for an immunogen is for stimulating antibody formation in a recipient and DNA coding for a non-immunogenic polypeptide is for gene therapy applications. DNA is incorporated into the microparticle without destruction of its function.

26 Claims, 13 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 10

L1: Entry 13 of 39 File: USPT Jan 13, 2004

US-PAT-NO: 6677313
DOCUMENT-IDENTIFIER: US 6677313 B1
**** See image for Certificate of Correction ****

TITLE: Method for gene therapy using nucleic acid loaded polymeric microparticles

DATE-ISSUED: January 13, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mathiowitz; Edith	Brookline	MA		
Jong; Yong S.	Warwick	RI		
Carino; Gerardo	Providence	RI		
Jacob; Jules S.	Taunton	MA		

US-CL-CURRENT: 514/44; 424/486, 424/497, 435/320.1, 435/455

ABSTRACT:

The invention involves methods and products for oral gene therapy. Genes under the control of promoters are protectively contained in microparticles and delivered to cells in operative form, thereby obtaining noninvasive gene delivery for gene therapy.

12 Claims, 1 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 1

L1: Entry 18 of 39 File: USPT Jun 3, 2003

US-PAT-NO: 6572894
DOCUMENT-IDENTIFIER: US 6572894 B2

TITLE: Process for the production of morphologically uniform microcapsules and microcapsules that are produced according to this process

DATE-ISSUED: June 3, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rossling; Georg	Berlin			DE
Albayrak; Celal	Berlin			DE
Tack; Johannes	Berlin			DE
Schmitz; Reinhard	Berlin			DE

US-CL-CURRENT: 424/497; 424/451, 424/486, 424/489, 514/2

ABSTRACT:

The invention relates to a process for the production of morphologically uniform microcapsules that contain peptides, proteins or other water-soluble biologically active substances as active ingredients as well as microcapsules that are produced according to this process with a degree of concentration of between 3 to 30% by weight and a diameter .ltoreq.8 .mu.m. According to the invention, biodegradable polymers are dissolved in a halogen-free solvent or solvent mixture, and the buffered active ingredient solution, which has a pH of between 6.0 to 8.0, is dispersed into this solution. Then, an aqueous solution that contains a surfactant (W/O/W-emulsion) is added to this W/O-emulsion, and the solvent is removed. The microcapsules that are produced with this process do not show any tendency toward agglomeration. The encapsulation efficiency of the process is approximately 90 to 95%.

14 Claims, 6 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 3

L1: Entry 19 of 39 File: USPT May 20, 2003

US-PAT-NO: 6565777
DOCUMENT-IDENTIFIER: US 6565777 B2

TITLE: Encapsulation of bioactive agents

DATE-ISSUED: May 20, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Farrar; Graham Henry	Salisbury			GB
Tinsley-Bown; Anne Margaret	Wilts			GB
Jones; David Hughes	Montreal			CA

US-CL-CURRENT: 264/4.1; 264/4.3, 264/4.33, 264/4.6, 427/213.3, 427/213.31, 427/213.36

ABSTRACT:

Bioactive agent is encapsulated in a polymer microparticle in a (water-in-oil)-in-water emulsion-based method, and using a solvent that comprises ethyl acetate. Also described are microparticles comprising low inherent viscosity (i.v.) PLG, some with i.v. less than 0.5 dl/g, and methods for their preparation. DNA release is modified through use of low i.v. PLG. A particle production method for scale-up uses a blender that avoids excessive shear damage to DNA being encapsulated.

5 Claims, 7 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 7

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☐ 11. Document ID: US 6753015 B2

L1: Entry 11 of 39 File: USPT Jun 22, 2004

US-PAT-NO: 6753015
DOCUMENT-IDENTIFIER: US 6753015 B2

TITLE: Microparticle compositions and methods for the manufacture thereof

DATE-ISSUED: June 22, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fang; Jia-Hwa	Oakland	CA		
Singh; Mammohan	Hercules	CA		
O'Hagan; Derek	Berkeley	CA		
Hora; Maninder	Danville	CA		

US-CL-CURRENT: 424/489; 424/484, 424/486

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw Desc | Image

☐ 12. Document ID: US 6743444 B2

L1: Entry 12 of 39 File: USPT Jun 1, 2004

US-PAT-NO: 6743444
DOCUMENT-IDENTIFIER: US 6743444 B2

TITLE: Method of making microencapsulated DNA for vaccination and gene therapy

DATE-ISSUED: June 1, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jones; David Hugh	Salisbury			GB
Farrar; Graham Henry	Salisbury			GB
Clegg; James Christopher Stephen	Salisbury			GB

US-CL-CURRENT: 424/468; 424/489, 424/490, 424/497, 435/320.1, 514/44

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw Desc | Image

☐ 13. Document ID: US 6677313 B1

L1: Entry 13 of 39 File: USPT Jan 13, 2004

US-PAT-NO: 6677313
DOCUMENT-IDENTIFIER: US 6677313 B1
** See image for Certificate of Correction **

TITLE: Method for gene therapy using nucleic acid loaded polymeric microparticles

DATE-ISSUED: January 13, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mathiowitz; Edith	Brookline	MA		
Jong; Yong S.	Warwick	RI		
Carino; Gerardo	Providence	RI		
Jacob; Jules S.	Taunton	MA		

US-CL-CURRENT: 514/44; 424/486, 424/497, 435/320.1, 435/455

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 14. Document ID: US 6667294 B2

L1: Entry 14 of 39 File: USPT Dec 23, 2003

US-PAT-NO: 6667294
DOCUMENT-IDENTIFIER: US 6667294 B2

TITLE: Microencapsulated DNA for vaccination and gene therapy

DATE-ISSUED: December 23, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jones; David Hugh	Devizes			GB
Farrar; Graham Henry	Salisbury			GB
Clegg; James Christopher Stephen	Salisbury			GB

US-CL-CURRENT: 514/44; 424/489, 424/490, 435/320.1, 435/455

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 15. Document ID: US 6642008 B1

L1: Entry 15 of 39 File: USPT Nov 4, 2003

US-PAT-NO: 6642008
DOCUMENT-IDENTIFIER: US 6642008 B1

TITLE: Assays and therapies for latent viral infection

DATE-ISSUED: November 4, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY

Harley; John B.	Oklahoma City	OK
James; Judith Ann	Edmond	OK
Kaufman; Kenneth M.	Oklahoma City	OK

US-CL-CURRENT: 435/7.1; 435/6, 435/7.94

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

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☐ 16. Document ID: US 6616869 B2

L1: Entry 16 of 39 File: USPT Sep 9, 2003

US-PAT-NO: 6616869
DOCUMENT-IDENTIFIER: US 6616869 B2

TITLE: Process for preparing microparticles through phase inversion phenomena

DATE-ISSUED: September 9, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mathiowitz; Edith	Brookline	MA		
Chickering, III; Donald	Pfulgerville	TX		
Jong; Yong S.	Warwick	RI		
Jacob; Jules S.	Taunton	MA		

US-CL-CURRENT: 264/4; 264/4.1, 427/213.36

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

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☐ 17. Document ID: US 6582704 B2

L1: Entry 17 of 39 File: USPT Jun 24, 2003

US-PAT-NO: 6582704
DOCUMENT-IDENTIFIER: US 6582704 B2

TITLE: Immunogenic peptides from the HPV E7 protein

DATE-ISSUED: June 24, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Urban; Robert G.	Lexington	MA		
Chicz; Roman M.	Belmont	MA		
Collins; Edward J.	Carrboro	NC		
Hedley; Mary Lynne	Lexington	MA		

US-CL-CURRENT: 424/204.1; 424/185.1, 424/186.1, 435/69.1, 435/69.7, 530/300, 530/350, 536/23.72

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image

☐ 18. Document ID: US 6572894 B2

L1: Entry 18 of 39 File: USPT Jun 3, 2003

US-PAT-NO: 6572894
DOCUMENT-IDENTIFIER: US 6572894 B2

TITLE: Process for the production of morphologically uniform microcapsules and microcapsules that are produced according to this process

DATE-ISSUED: June 3, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rossling; Georg	Berlin			DE
Albayrak; Celal	Berlin			DE
Tack; Johannes	Berlin			DE
Schmitz; Reinhard	Berlin			DE

US-CL-CURRENT: 424/497; 424/451, 424/486, 424/489, 514/2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 19. Document ID: US 6565777 B2

L1: Entry 19 of 39 File: USPT May 20, 2003

US-PAT-NO: 6565777
DOCUMENT-IDENTIFIER: US 6565777 B2

TITLE: Encapsulation of bioactive agents

DATE-ISSUED: May 20, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Farrar; Graham Henry	Salisbury			GB
Tinsley-Bown; Anne Margaret	Wilts			GB
Jones; David Hughes	Montreal			CA

US-CL-CURRENT: 264/4.1; 264/4.3, 264/4.33, 264/4.6, 427/213.3, 427/213.31, 427/213.36

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 20. Document ID: US 6562943 B1

L1: Entry 20 of 39 File: USPT May 13, 2003

US-PAT-NO: 6562943
DOCUMENT-IDENTIFIER: US 6562943 B1

TITLE: Peptide epitopes recognized by disease promoting CD4+ T lymphocytes

DATE-ISSUED: May 13, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Peakman; Mark	London			GB
Chicz; Roman M.	Belmont	MA		

US-CL-CURRENT: 530/324

Terms	Documents
5783567	39

L1: Entry 21 of 39 File: USPT Apr 15, 2003

US-PAT-NO: 6548302
DOCUMENT-IDENTIFIER: US 6548302 B1

TITLE: Polymers for delivery of nucleic acids

DATE-ISSUED: April 15, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mao; Hai-Quan	Towson	MD		
Lin; Kevin Y.	Placentia	CA		
Hendriks; Bart S.	Cambridge	MA		
Leong; Kam W.	Ellicott City	MD		
Haller; Michael F.	Baltimore	MD		

US-CL-CURRENT: 435/455; 424/450, 435/325, 435/375, 514/44, 977/906

ABSTRACT:

The present invention relates to compositions and methods for delivery of nucleic acids. In particular, the invention provides a polymeric delivery formulation including a nucleic acid to be transfected into a host cell, formulated in a biodegradable polymer having phosphorous-based linkages.

29 Claims, 22 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 12

L1: Entry 25 of 39 File: USPT Oct 1, 2002

US-PAT-NO: 6458370
DOCUMENT-IDENTIFIER: US 6458370 B1

TITLE: Use of microparticles combined with submicron oil-in-water emulsions

DATE-ISSUED: October 1, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
O'Hagan; Derek	Berkeley	CA		
Van Nest; Gary	El Sobrante	CA		
Ott; Gary S.	Oakland	CA		
Singh; Manmohan	Hercules	CA		

US-CL-CURRENT: 424/278.1; 424/204.1, 424/228.1, 424/283.1, 424/70.11, 424/70.19, 435/4, 435/5, 435/6, 977/802

CLAIMS:

We claim:

1. A composition comprising a submicron oil-in-water emulsion, and a selected antigen entrapped in, or adsorbed to, a biodegradable microparticle, wherein the antigen is an HIV antigen.

2. The composition of claim 1, wherein the microparticle is formed from a poly(.alpha.-hydroxy acid) selected from the group consisting of poly(L-lactide), poly(D,L-lactide) and poly(D,L-lactide-co-glycolide).

3. The composition of claim 2, wherein the microparticle is formed from poly(D,L-lactide-co-glycolide).

4. The composition of claim 1, wherein the submicron oil-in-water emulsion comprises 4-5% w/v squalene, 0.25-0.5% w/v polyoxyethylene sorbitan monooleate, and 0.5% w/v sorbitan trioleate, and optionally, N-acetylmuramyl-L-alanyl-D-isogluatminyl-L-alanine-2-(1'-2'-dipalmitoyl-sn -glycero-3-hydroxyphosphoryloxy)-ethylamine.

5. The composition of claim 1, wherein the selected antigen is gp120.

6. The composition of claim 1, wherein the selected antigen is p24gag.

7. The composition of claim 1, wherein the selected antigen is entrapped in the microparticle.

8. The composition of claim 1, wherein the selected antigen is adsorbed to the microparticle.

9. A method of inducing an immune response which comprises administering to a vertebrate subject (a) a submicron oil-in-water emulsion, and (b) a therapeutically effective amount of a selected antigen entrapped in, or adsorbed to, a biodegradable microparticle.

10. The method of claim 9, wherein the microparticle is formed from a poly(.alpha.-hydroxy acid) selected from the group consisting of poly(L-lactide), poly(D,L-lactide) and poly (D,L-lactide-co-glycolide).

11. The method of claim 10, wherein the microparticle is formed from poly(D,L-lactide-co-glycolid).

12. The method of claim 9, wherein the selected antigen is a viral antigen.

13. The method of claim 12, wherein the selected antigen is gp120.

14. The method of claim 12, wherein the selected antigen is p24gag.

15. The method of claim 12, wherein the selected antigen is hepatitis C virus E2.

16. The method of claim 9, wherein the selected antigen is entrapped in the microparticle.

17. The method of claim 9, wherein the selected antigen is adsorbed to the microparticle.

18. The method of claim 9, wherein the submicron oil-in-water emulsion is administered prior to the microparticle.

19. The method of claim 9, wherein the submicron oil-in-water emulsion is administered subsequent to the microparticle.

20. The method of claim 9, wherein the submicron oil-in-water emulsion is administered substantially concurrently with the microparticle.

21. The composition of claim 1, wherein the submicron oil-in-water emulsion further comprises N-acetylmuramyl-L-alanyl-D-isogluatminyl-L-alanine-2-(1'-2'-dipalmitoyl-sn -glycero-3-hydroxyphosphoryloxy)-ethylamine.

22. The method of claim 9, wherein the submicron oil-in-water emulsion further comprises N-acetylmuramyl-L-alanyl-D-isogluatminyl-L-alanine-2-(1'-2'-dipalmitoyl-sn -glycero-3-hydroxyphosphoryloxy)-ethylamine.

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L1: Entry 27 of 39 File: USPT Jun 18, 2002

US-PAT-NO: 6406719
DOCUMENT-IDENTIFIER: US 6406719 B1

TITLE: Encapsulation of bioactive agents

DATE-ISSUED: June 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Farrar; Graham Henry	Salisbury			GB
Tinsley-Brown; Anne Margaret	Salisbury			GB
Jones; David Hugh	Montreal			CA

US-CL-CURRENT: 424/489; 424/497, 424/501, 428/402.2, 428/402.21

ABSTRACT:

Bioactive agent is encapsulated in a polymer microparticle in a (water-in-oil)-in-water emulsion-based method, and using a solvent that-comprises ethyl acetate. Also described are microparticles comprising low inherent viscosity (i.v.) PLG, some with i.v. less than 0.5 dl/g, and methods for their preparation. DNA release is modified through use of low i.v. PLG. A particle production method for scale-up uses a blender that avoids excessive shear damage to DNA being encapsulated.

5 Claims, 7 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 7

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Search Results - Record(s) 21 through 30 of 39 returned.

☐ 21. Document ID: US 6548302 B1

L1: Entry 21 of 39 File: USPT Apr 15, 2003

US-PAT-NO: 6548302
DOCUMENT-IDENTIFIER: US 6548302 B1

TITLE: Polymers for delivery of nucleic acids

DATE-ISSUED: April 15, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mao; Hai-Quan	Towson	MD		
Lin; Kevin Y.	Placentia	CA		
Hendriks; Bart S.	Cambridge	MA		
Leong; Kam W.	Ellicott City	MD		
Haller; Michael F.	Baltimore	MD		

US-CL-CURRENT: 435/455; 424/450, 435/325, 435/375, 514/44, 977/906

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 22. Document ID: US 6521431 B1

L1: Entry 22 of 39 File: USPT Feb 18, 2003

US-PAT-NO: 6521431
DOCUMENT-IDENTIFIER: US 6521431 B1

TITLE: Biodegradable cross-linkers having a polyacid connected to reactive groups for cross-linking polymer filaments

DATE-ISSUED: February 18, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kiser; Patrick F.	Durham	NC		
Thomas; Allen A.	Carlsbad	CA		

US-CL-CURRENT: 435/177; 424/484, 424/486, 424/489, 424/93.1, 424/93.7, 435/174, 435/178, 435/180, 435/395, 514/44, 530/812, 530/813, 530/815, 977/906

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 23. Document ID: US 6492498 B1

L1: Entry 23 of 39 File: USPT Dec 10, 2002

US-PAT-NO: 6492498
DOCUMENT-IDENTIFIER: US 6492498 B1
** See image for Certificate of Correction **

TITLE: Multimeric immunotoxins

DATE-ISSUED: December 10, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Vallera; Daniel A.	St. Louis Park	MN		
Blazar; Bruce R.	Golden Valley	MN		

US-CL-CURRENT: 530/391.7; 424/183.1, 530/300, 530/350, 530/387.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 24. Document ID: US 6475995 B1

L1: Entry 24 of 39 File: USPT Nov 5, 2002

US-PAT-NO: 6475995
DOCUMENT-IDENTIFIER: US 6475995 B1

TITLE: Oral delivery of nucleic acid vaccines by particulate complexes

DATE-ISSUED: November 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Roy; Krishnendu	Baltimore	MD		
Huang; Shau-Ku	Towson	MD		
Sampson; Hugh	Larchmont	NY		
Leong; Kam W.	Ellicot City	MD		

US-CL-CURRENT: 514/44; 424/489, 424/492, 424/497, 424/499, 435/320.1, 435/455, 977/916, 977/918

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 25. Document ID: US 6458370 B1

L1: Entry 25 of 39 File: USPT Oct 1, 2002

US-PAT-NO: 6458370
DOCUMENT-IDENTIFIER: US 6458370 B1

TITLE: Use of microparticles combined with submicron oil-in-water emulsions

DATE-ISSUED: October 1, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
O'Hagan; Derek	Berkeley	CA		
Van Nest; Gary	El Sobrante	CA		
Ott; Gary S.	Oakland	CA		
Singh; Manmohan	Hercules	CA		

US-CL-CURRENT: 424/278.1; 424/204.1, 424/228.1, 424/283.1, 424/70.11, 424/70.19, 435/4, 435/5, 435/6, 977/802

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 26. Document ID: US 6406852 B1

L1: Entry 26 of 39 File: USPT Jun 18, 2002

US-PAT-NO: 6406852
DOCUMENT-IDENTIFIER: US 6406852 B1

TITLE: Method for preparation of microprojectiles for efficient delivery of biologicals using a particle gun

DATE-ISSUED: June 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Tuli; Rakesh	Lucknow			IN
Sawant; Samir V.	Lucknow			IN

US-CL-CURRENT: 435/6; 435/459, 435/470

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 27. Document ID: US 6406719 B1

L1: Entry 27 of 39 File: USPT Jun 18, 2002

US-PAT-NO: 6406719
DOCUMENT-IDENTIFIER: US 6406719 B1

TITLE: Encapsulation of bioactive agents

DATE-ISSUED: June 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Farrar; Graham Henry	Salisbury			GB
Tinsley-Brown; Anne Margaret	Salisbury			GB
Jones; David Hugh	Montreal			CA

US-CL-CURRENT: 424/489; 424/497, 424/501, 428/402.2, 428/402.21

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 28. Document ID: US 6309569 B1

L1: Entry 28 of 39 File: USPT Oct 30, 2001

US-PAT-NO: 6309569
DOCUMENT-IDENTIFIER: US 6309569 B1

TITLE: Encapsulation of bioactive agents

DATE-ISSUED: October 30, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Farrar; Graham Henry	Salisbury			GB
Tinsley-Bown; Anne Margaret	Salisbury			GB
Jones; David Hugh	Montreal			CA

US-CL-CURRENT: 264/4.1; 264/4.3, 264/4.33, 264/4.6, 427/213.3, 427/213.31, 427/213.36

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 29. Document ID: US 6306405 B1

L1: Entry 29 of 39 File: USPT Oct 23, 2001

US-PAT-NO: 6306405
DOCUMENT-IDENTIFIER: US 6306405 B1

TITLE: Use of microparticles combined with submicron oil-in-water emulsions

DATE-ISSUED: October 23, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
O'Hagan; Derek	Berkeley	CA		
Van Nest; Gary	El Sobrante	CA		
Ott; Gary S.	Oakland	CA		
Singh; Manmohan	Hercules	CA		

US-CL-CURRENT: 424/278.1; 424/204.1, 424/228.1, 424/283.1, 977/802, 977/918

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 30. Document ID: US 6270795 B1

L1: Entry 30 of 39 File: USPT Aug 7, 2001

US-PAT-NO: 6270795
DOCUMENT-IDENTIFIER: US 6270795 B1

TITLE: Method of making microencapsulated DNA for vaccination and gene therapy

DATE-ISSUED: August 7, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jones; David Hugh	Salisbury			GB
Farrar; Graham Henry	Salisbury			GB
Clegg; James Christopher Stephen	Salisbury			GB

US-CL-CURRENT: 424/455; 424/451, 424/457, 424/484, 424/486, 424/489, 424/490, 435/320.1

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Terms	Documents
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L1: Entry 31 of 39 File: USPT Jul 31, 2001

US-PAT-NO: 6268053
DOCUMENT-IDENTIFIER: US 6268053 B1

TITLE: Macromolecular microparticles and methods of production and use

DATE-ISSUED: July 31, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Woiszwillo; James E.	Milford	MA		
Brown; Larry R.	Newton	MA		
Scott; Terrence L.	Winchester	MA		
Di; Jie	Norwood	MA		
Sudhalter; Judith	Newton	MA		
Blizzard; Charles D.	Roxbury	MA		
Riske; Frank J.	Stoughton	MA		

US-CL-CURRENT: 428/402; 436/523, 436/528, 530/350, 530/402

CLAIMS:

We claim:

1. A microparticle comprising macromolecule and polymer, wherein the concentration of macromolecule in the microparticle is at least 40% and less than 100% by weight.

2. A microparticle comprising a macromolecule and a polymer, wherein said macromolecule is a hormone, and said polymer is a water soluble, linear or branched high molecular weight polymer capable of removing water from the macromolecule.

3. The microparticle of claim 2 wherein the polymer is selected from the group consisting of polyvinylpyrrolidone, polyethylene glycol, dextran, nonylphenol ethoxylates, polyvinyl alcohol, and mixtures thereof.

4. The microparticle of claim 3 wherein the polymer is a mixture of polyvinylpyrrolidone and polyethylene glycol.

5. A method of preparing a microparticle comprising combining a hormone and a water soluble, linear or branched high molecular weight polymer in an aqueous solution, and heating the peptide hormone and polymer for a sufficient period of time to form microparticles.

6. The method of claim 5 wherein the polymer is selected from the group consisting of polyvinylpyrrolidone, polyethylene glycol, dextran, nonylphenol ethoxylates, polyvinyl alcohol, and mixtures thereof.

7. The method of claim 6 wherein the polymer is a mixture of polyvinylpyrrolidone and polyethylene glycol.

8. The method of claim 5 wherein the hormone and polymer are heated at a temperature in

the range of from about 37.degree. C. to about 90.degree. C., for 5 minutes to 2 hours.

9. The method of claim 8 wherein the peptide hormone and polymer are heated at a temperature in the range of from about 50.degree. C. to about 90.degree. C., for 5 minutes to 30 minutes.

10. A microparticle prepared by the method of claim 5.

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